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ABSTRACT

A new typology for faculty is proposed, based on their expressed priorities toward activities in which research universities engage. Responses of 617 faculty to a survey of 66 statements about university activities were factor analyzed, and scores on eight factors obtained were used in a cluster analysis that produced three clusters of faculty. When coded into disciplinary groupings, the faculty clustered along lines defined by their political description and gender. Items included in the following eight factors and their loadings are identified: (1) concerns about minorities and women; (2) liberal arts, liberal education; (3) nontraditional education; (4) intercollegiate athletics; (5) concerns about quality and research; (6) health care and training; (7) professional education; and (8) concerns about student health. The primary strength of this approach involves the effort to relate faculty groupings to institutional priorities as well as the assumption of heterogeneity rather than homogeneity among faculty members belonging to a specific department. The results are compared to Biglan's (1973) typology; some correspondence is found with his "hard-soft" axis, or applied-pure and life-non-life dimensions, which were used to classify departments. (Author/SW)

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# STUDYING FACULTY BEHAVIOR:

## An Activity-Driven Typology

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Abstract

A new typology for faculty is proposed, based on their expressed priorities toward activities in which universities engage. Responses of 617 faculty to a survey of 66 statements about university actvities were factor analyzed, and scores on the eight factors obtained were used in a cluster analysis which produced three clusters of faculty. When coded into disciplinary groupings, the faculty in this study clustered along lines defined by their political description and gender. The results are compared to Biglan's (1973a) typology; some correspondence is found with his "hard-soft" axis.

# Studying Faculty Behavior: An Activity-Driven Typology

Issues of faculty renewal currently occupy a prominent place on the agendas of most colleges and universities. A recent study documents widespread existence of professional malaise (Schuster and Bowen, 1985). But better understanding of approaches to faculty revitalization can not rely exclusively on studies that view academics from the perspective of their occupational classification as members of a self-governing profession which changes, if at all, by evolutionary processes over extended time periods. There is need as well to understand organizational variables capable of causing significant alterations in the behavior patterns and perceived satisfaction of faculty members in the short term. Because general conditions of the profession are unlikely to change significantly as long as the potential supply of academics in most fields exceeds actual demand, institutions must rely on the variables they control as their major strategy for reducing disjunctures between the behavior of tenured faculty members and the demands of a changing external and internal environment. The ability to understand faculty behavior from an organizational perspective would be significantly enhanced by the development of models that were capable of classifying behavior at a level of sophistication that exceeded departmental affiliation, the most common basis for past

efforts to discriminate. The purpose of this paper is to review past attempts to establish useful typologies and to propose a new scheme based on the concept of expressed priorities for activities in which universities ordinarily engage.

## Review of the Literature

There have been several approaches to classifying departments, disciplines and faculty. Biglan (1973a) used the judgments of 168 faculty members at the University of Illinois about perceived similarities between 35 departments as the input to a non-metric multi-dimensional scaling analysis. Three significant dimensions emerged from an interpretation of the characteristics of departments falling at opposite ends of three scales: "(a) the degree to which a paradigm exists, (b) the degree of concern with application, and (c) concern with life systems." (p. 202) These dimensions, called for convenience hard-soft, applied-pure and life-non-life, were used to classify departments in the eight categories of this 2x2x2 classification as indicated in Table 1.

Table 1
Clustering of Academic Task Areas in Three Dimensions

| Task Area | Hard | | Soft | |
|---|---|---|---|---|
| | Nonlife system | Life system | Nonlife system | Life system |
| Pure | Astronomy<br>Chemistry<br>Geology<br>Math<br>Physics | Botany<br>Entomology<br>Microbiology<br>Physiology<br>Zoology | English<br>German<br>History<br>Philosophy<br>Russian<br>Communications | Anthropology<br>Political Science<br>Psychology<br>Sociology |
| Applied | Ceramic Engineering<br>Civil Engineering<br>Computer Science<br>Mechanical Engineering | Agronomy<br>Dairy Science<br>Horticulture<br>Agricultural Economics | Accounting<br>Finance<br>Economics | Educational Administraton & Superv.<br>Secondary & Continuing Education<br>Special Education<br>Vocational & Technical Education |

Note. From "Relationships between subject matter characteristics and the structure and output of university departments" by A. Biglan, 1973, Journal of Applied Psychology, 57(3), p. 207.

In further research, Biglan (1973b), found significant differences between departments on the three axes on the following variables: scholars' social connectedness to others; commitment to teaching, research and service; number of journal articles, monographs and technical reports published; and the number of dissertations sponsored. Creswell and Roskens (1981) reported on seven additional studies based on the Biglan classifications. Using a variety of independent variables (e.g., salaries, publications, goals, job satisfaction) and data from a number of institutions "consistent differences between the hard and soft, pure and applied, and life and nonlife areas" (p. 6) were found.

These studies have assumed that faculty within a department (or "primary field of research" (Creswell and Bean, 1981, p. 75)) were homogeneous and have grouped them a priori into their academic departments for analysis.

Two other researchers have made the case for differentiation between disciplines on the basis of logic, rather than empirical evidence. Clark (1980) argued for the existence of "cultures of discipline, profession, enterprise, and system" (p. 3), noting that recruits to the various academic specialties are differentiated by their adoption of the dominant paradigms in their fields, similarities in subject matter and other socializing influences unique to each discipline. He contends that this disciplinary bonding is stronger than the bond faculty feel toward their institutions of employment. A matrix model of university organization, influence and allegiance proposed by Alpert (1985) makes a similar case for the dominant influence of profession or discipline on faculty members. Cresswell and Bean's (1981) study appears to support this view that increasing socialization (as measured by length of service and tenure/non-tenure status) into subject areas results in clearer differentiation between the Biglan categories.

Holland (1985, reporting work in progress since 1958) proposes six basic personality types and model environments: realistic, investigative, artistic, social, enterprising and conventional. His theory of personality types has been

extensively tested, and repeatedly validated (Holland, 1985, p. x, cites over 400 studies). Used mainly in college settings to study students, the theory was also extended to describe university departments through an empirical occupational classification; academic departments were categorized according to the occupation for which their students were being prepared. Agronomy departments, for instance, were realistic, psychology departments were social and accounting departments conventional, because that is how agronomists, psychologists and accountants were classified. (Holland, Whitney, Cole and Richards, 1969).

Several significant studies of faculty have used Holland's model. Smart and McLaughlin (1974) employed it in a study of goal priorities of a large national sample of department chairpersons who were queried about their level of support for "eleven commonly assumed goals" (p. 380). The 11 goals were analyzed into five factors. Significant differences in support levels for these clusters of goals were found when the departments were grouped by Holland's classifications.

The Faculty Orientation Survey (FOS), developed to assess faculty attitudes about the teaching-learning process, including such areas as grading policy, extracurricular activities, student participation and the role of vocationalism yields results on six factor-derived scales (Morstain, 1973, cited in Morstain and Smart, 1976). Morstain and Smart (1976) administered the FOS to the faculty at a public university with the Holland

classifications used as independent variables in one-way analyses of variance. They found significant differences between groups on responses to the FOS.

Stark and Morstain (1978), used the FOS to assess educational orientations of faculty in six liberal arts colleges. A factor analysis produced 7 scales; stepwise discriminant analysis identified two significant functions: "preparation for life and work" and "pursuit of ideas" (p. 432). The discriminant function correctly classified 43.6 percent of the faculty into four broad disciplinary groups defined a priori--humanities, social sciences, natural sciences and professional/applied fields.

Although the studies cited above vary in many respects, they have in common the assumption that the ability to classify departments or faculty is important to understanding the dynamics of faculty behavior and to the appropriate management of change in a university. This study adopts that assumption as well, but proposes a different framework for classifying faculty, based on their perceived importance of the activities in which research universities engage.

A typology of faculty, to be optimally useful to university administrators or to researchers studying faculty behavior, should classify faculty in terms of the behavior for which the university rewards them. Further, an optimally useful typology should take into account the multi-dimensional nature of

disciplines and/or departments. It may be useful to know how faculty differ across disciplines as well as how disciplines themselves vary.

To begin the development of such a typology, we analyzed an existing database consisting of the responses of a representative sample of faculty members from two research universities to a survey requesting their perceptions of the relative importance of 66 statements judged by a panel of university administrators, regents and researchers as typical of the activities in which research universities engage.

## Methodology

The study drew upon a survey completed during the fall of 1982 which asked state legislators, members of a Board of Regents, a random sample of registered voters, a random sample of an organization of interested and influential citizens, senior administrators and faculty from three state universities to assign priorities to the activities carried out by these universities and to indicate how well they believed these activities were being performed. The results of the 1982 survey and a copy of the survey instrument are available in Richardson, et al., 1984.

The survey consisted of 66 activity statements describing specific, measurable activities, and, where appropriate, the clientele toward which the activity was directed. To ensure the items were comprehensive and representative, they were reviewed

by faculty, deans and administrators at the participating institutions and by outside experts in the field of higher education. The methodology for developing and analyzing this type of survey as well as a rationale for using activity-driven statements to define institutional goals has been described in greater detail elsewhere (Doucette, Richardson and Fenske, 1985). The 66 items are reproduced in Appendix A.

This study used a random sample (n=617) of faculty from the two large research universities in the system, stratified by rank and by gender. To ensure adequate representation from all departments on each campus, faculty were systematically selected by college, with rates varying from 100% for colleges having a small faculty (n<50), 50% for medium colleges (50>n<100) to 25% for large colleges (n>100). Where appropriate, the data were weighted by the inverse of the sampling proportion for analysis. Response rates for the two universities were 84% (285 usable of 340 sampled) and 82% (333 of 405). The faculty in the sample were 20.8% female and 8.4% minority. Of the total, 21.9% were assistant professors, 33.4% associates and 44.6% professors. Almost 23% were under 37 years old, 25% 38 to 43, 27% 44 to 52 and 25% were 53 and over.

Factor Analysis

A common factor analysis was performed on the responses to the 66 activity statements. A maximum-likelihood solution (Lawley and Maxwell, 1971) was obtained, and orthogonal rotation

was performed. The scree test (Cattell, 1966) and the interpretability of the rotated factors (Marradi, 1981) were used to determine the number of factors to extract. The analysis was repeated after deleting items which did not load highly on any factor, which did not contribute to the interpretability of the factor, or which loaded highly on more than one factor (Marradi, 1981). Five iterations of this process produced an eight factor solution using 25 of the original 66 items. The items included in each factor and their loadings are shown in Table 2. Titles which reflect the nature of the items are given for each factor. The shorthand name for the factor used for discussion appears in parentheses after the title. The full final rotated factor structure is included as Appendix B.

Table 2
Factor Loadings and Text for 25 Items on 8 Factors

Factor 1. Concerns about Minorities and Women (Minority).

| LOADING | ITEM | |
|---|---|---|
| 92 | #49 | Make special efforts to recruit and retain qualified minority faculty. |
| 76 | #23 | Actively recruit and offer financial aid to ethnic and racial minorities. |
| 75 | #31 | Make special efforts to recruit and retain qualified women faculty. |
| 68 | #66 | Provide special tutoring and advisement to ethnic and racial minority students to help them get through their educational programs. |

Factor 2. Liberal Arts, Liberal Education (Libarts).

| | | |
|---|---|---|
| 64 | #26 | Encourage advancement in the creative arts by sponsoring arts events, exhibitions and performances. |
| 63 | #63 | Offer selected master's and doctoral degree programs in the humanities, fine arts, social and behavioral |

sciences, physical sciences and mathematics.

55 # 1 Sponsor films, speakers, exhibitions and musical and dramatic productions for students and the community.

54 #13 Accept international students who meet university admission standards.

53 #47 Offer selected undergraduate degree programs in the humanities, fine arts, social and behavioral sciences, physical sciences and mathematics.

46 #19 Require all undergraduate degree programs to include liberal education courses such as humanities, fine arts, social and behavioral sciences, physical sciences and mathematics.

Factor 3. Non-traditional Education (Nontrad).

66 #43 Offer selected courses by telecommunication, radio or correspondence.

63 #55 Offer selected courses to groups of employees at their work place.

61 #53 Offer selected courses and degree programs at off-campus locations or branch campuses.

Factor 4. Intercollegiate Athletics (Athletic).

87 #21 Sponsor competitive intercollegiate athletic programs for men and women.

67 #64 Actively recruit and offer financial aid to students with athletic talents.

Factor 5. Concerns about Quality and Research (Quality).

69 #38 Sponsor research to attract and keep well qualified faculty and students.

63 #56 Make special efforts to recruit and retain recognized scholars and researchers for university faculties.

42 #42 Support the education program with research laboratories like those used in business and industry.

Factor 6. Health Care and Training (Health).

63 # 2 Provide health care to the general public on a fee-for-service basis to train medical and other health professionals.

63 #36 Operate a teaching hospital to advance knowledge and to help train medical and other health science students.

| | | |
|---|---|---|
| 40 | #62 | Develop programs in veterinary medicine, dentistry, optometry, and other professional areas not currently available at any Arizona university. |

Factor 7. Professional Education (Profesnl).

| | | |
|---|---|---|
| 65 | #60 | Offer selected master's and doctoral degree programs in business, engineering, education, architecture, social work, public administration, agriculture and forestry. |
| 64 | # 7 | Offer selected undergraduate degree programs in business, engineering, education, architecture, social work, nursing, public administration, agriculture and forestry. |

Factor 8. Concerns about Student Health (Stuhelth).

| | | |
|---|---|---|
| 79 | #58 | Provide counseling and health services to help students avoid or cope with unwanted pregnancies. |
| 45 | #52 | Provide students immediate medical care and continuing education on health-related problems. |

Note. Loadings have been multiplied by 100 and rounded to the nearest integer.

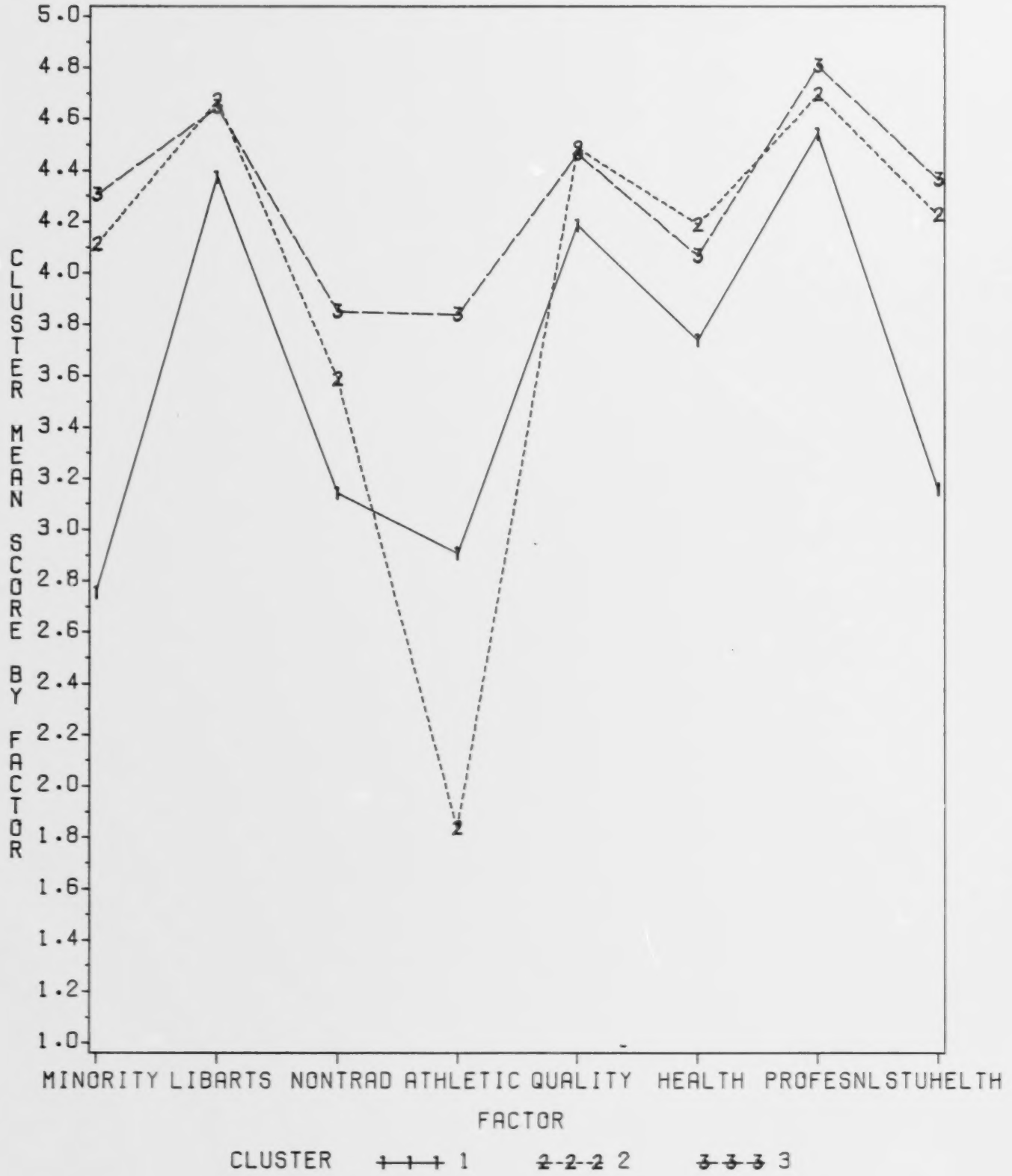
Cluster Solution

To classify faculty according to their responses, factor scores were constructed for each observation by taking the linear combination of responses by that faculty member to the items loading on each of the eight factors and dividing by the number of non-missing responses. These factor scores were then used as the independent variables in a k-means (MacQueen, 1967) cluster solution. This procedure finds clusters of points such that the Euclidean distance computed between them on the independent variables is smaller than the distance between points in any other cluster. As in factor analysis, determining the correct number of clusters is in part a subjective process. Sarle (1983) suggests repeating the analysis with varying numbers of clusters

and examining the cubic clustering criterion (CCC) for a maximum value. The CCC is a ratio of the observed $R^2$ to the expected $R^2$, under the null hypothesis of sampling from a uniform distribution on a hyperbox. "Positive values of the CCC mean that the obtained $R^2$ is greater than would be expected if sampling from a uniform distribution and therefore indicate the possible presence of clusters." (Sarle, 1983, p. 4). Two through five cluster solutions were obtained, with CCC's from 3.552 to -0.641 respectively. The peak CCC was 3.756 for the three cluster solution, with an overall $R^2$ of 0.320. As this solution also met the criterion of interpretability (Lorr, 1983), it was chosen for this analysis.

The three cluster solution yielded *n*'s of 167, 165 and 275 for the three groups. Figure 1 shows the profile for each group obtained by plotting the weighted mean score for the group members for each factor. An analysis of variance on the eight factors showed cluster membership to have great explanatory value, with a Wilk's Lambda of .157, $F(16, 1194) = 113.73$, $p<.0001$). Cluster one had the lowest mean score on every factor except for Athletics. Scheffe's post hoc tests indicated that cluster one was significantly different from clusters two and three ($p<.05$) for every factor except Professional. On Professional, cluster one is different from cluster three, but cluster two cannot be distinguished from either one or three. Clusters two and three are significantly different only on the

Figure 1.
Mean Scores for 3 Clusters on 8 Factors




Note: Cluster N's are: 1=167, 2=165, 3=275.

Athletic factor, where cluster two has the lowest mean score of any of the clusters on any of the factors.

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Insert Figure 1 about here

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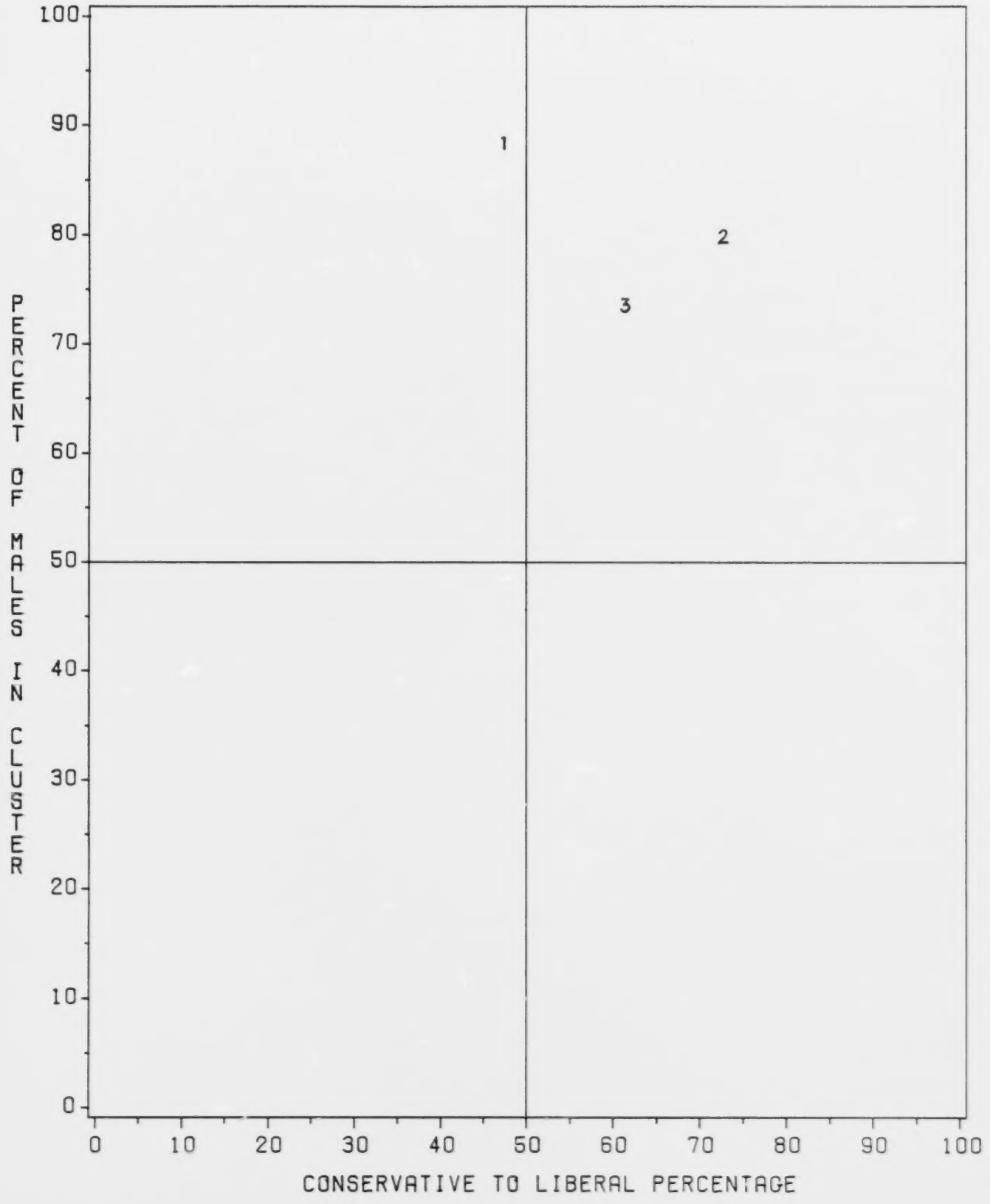
To determine the composition of the three clusters, the demographic variables available for faculty members were examined. The variables used included: age, gender, academic rank, tenure status, disciplinary grouping, ethnicity, income, marital status and self-described political persuasion on a five-point scale from conservative to liberal. Chi-squares of these variables against cluster membership showed only gender, disciplinary grouping and political description to be significant ($p<.05$).

The clusters are best differentiated by gender and political description. Percent male was defined as the number of males in a cluster divided by the sum of males and females combined. Percent liberal was calculated by taking a weighted sum of the responses to the political persuasion question, dividing by the number of responses and multiplying by 100. The weights were 0 for conservative, .25 for somewhat conservative, .50 for middle-of-the-road, .75 for somewhat liberal and 1 for liberal. Thus a cluster whose members all answered "liberal" on the political description question would score as 100% liberal; one with equal numbers of responses in all five categories would score as 50%

Figure 2.
Clusters Plotted by Gender and Political Description



liberal, and so on. A cluster with all male members would score 100% male; with 75% males and 25% females the score would be 75% male. To illustrate, Table 3 shows the three clusters with the numbers of members of each cluster in each gender and political description category along with the calculated male and liberal percentages. Figure 2 graphs the clusters by percentage of male and liberal.

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Insert Figure 2 about here

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Table 3
Clusters by Gender and Political Description

| Cluster | Male | Female | Con | Somcon | Mroad | Somlib | Lib | Male% | Liberal% |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 144 | 19 | 15 | 52 | 44 | 35 | 15 | 88.3 | 47.4 |
| 2 | 130 | 33 | 6 | 14 | 23 | 63 | 54 | 79.8 | 72.7 |
| 3 | 202 | 73 | 11 | 43 | 71 | 96 | 45 | 73.5 | 61.4 |

Note: Totals may not equal 617 because of missing values and because ten outlying observations were not classified.

The data for percent liberal relate intuitively to expected mean differences on the eight factors, particularly in terms of the Minority, Athletic and Student health factors which exhibit the largest differences between the groups. An examination of the items making up these factors suggests that these are factors where political persuasion could be expected to influence attitudes. Cluster one has the lowest liberal percentage, and also has the lowest mean scores on factors dealing with concerns about minorities and women (Minority), and on the factor

containing the item dealing with abortions for students (Stuhelth). Cluster two has the highest liberal percentage, and scored the lowest on the Athletic factor.

The data from the original survey were coded by clusters of related disciplines rather than by department to take into account the varying administrative arrangements among the three universities as well as the small number of faculty members in some departments produced by the sample. These groupings of related disciplines were then classified into Biglan categories according to the departments they contained. Table 4 shows the relationships between the disciplinary groups reported here and the 35 departments classified by Biglan. The Biglan classification is in parentheses after the department names.

Table 4
Comparison of Biglan Typologies with Disciplinary Groups

| DISCIPLINARY GROUPING | BIGLAN |
|---|---|
| Agriculture | Agronomy, Dairy Science, Horticulture, Agricultural Economics (HLA) |
| Architecture | None |
| Business Administration | Accounting, Finance, Economics (SNA) |
| Earth Science | Geology[1] (HNP) |
| Education | Educational Administration and Supervision, Secondary and Continuing Education, Special Education, Vocational and Technical Education (SLA) |
| Engineering | Ceramic Engineering, Civil Engineering, Computer Science, Mechanical Engineering (HNA) |
| Fine Arts | None |
| Law | None |
| Liberal Arts | English, German, History, Philosophy (SNP) Anthropology, Political Science, Psychology, Sociology (SLP) |
| Military Science | None |
| Mines | None |
| Nursing/Health-related | None |
| Other Liberal Arts[2] | None |
| Public Programs | None |
| Sciences | Astronomy, Chemistry, Geology, Math, Physics (HNP) Botany, Entomology, Microbiology, Physiology, Zoology (HLP) |
| Social Work | None |
| Speech and Arts | None |

Of the 17 disciplinary groups, only seven had direct correspondence with Biglan-classified departments. However, all eight Biglan categories were represented, as Sciences and

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[1]As classified by Cresswell and Bean (1981, p. 91).
[2]Home Economics, Health Physical Education and Physical Education departments.

Humanities both encompass departments represented in the life as well as the nonlife Biglan categories.[3]

Figure 3 plots disciplinary grouping on the same gender and liberal axes used in Figure 2 to plot clusters, yielding two clusters organized in general along hard-soft lines, with the hard departments tending to be more conservative and more male than the soft departments. Previous research (Ladd and Lipset, 1975), has also demonstrated a relationship between "political distance" and a "liberal versus applied" continuum (p. 70)[4]. The pure-applied and life-non-life dimensions found by Biglan are not separated in these data. Business administration was classified as soft by Biglan; here it clusters with the hard groupings. The increasing quantitative emphasis in this area in recent years may be moving it toward a more paradigmatic orientation. A judgmental classification of the remaining ten disciplinary groups on the hard-soft axis appears to reinforce the cluster structure. Mines, Architecture and Pharmacy share subject matter and other characteristics with hard areas; while Public Programs, Fine Arts, Speech and Arts, Social Work and Other Liberal Arts

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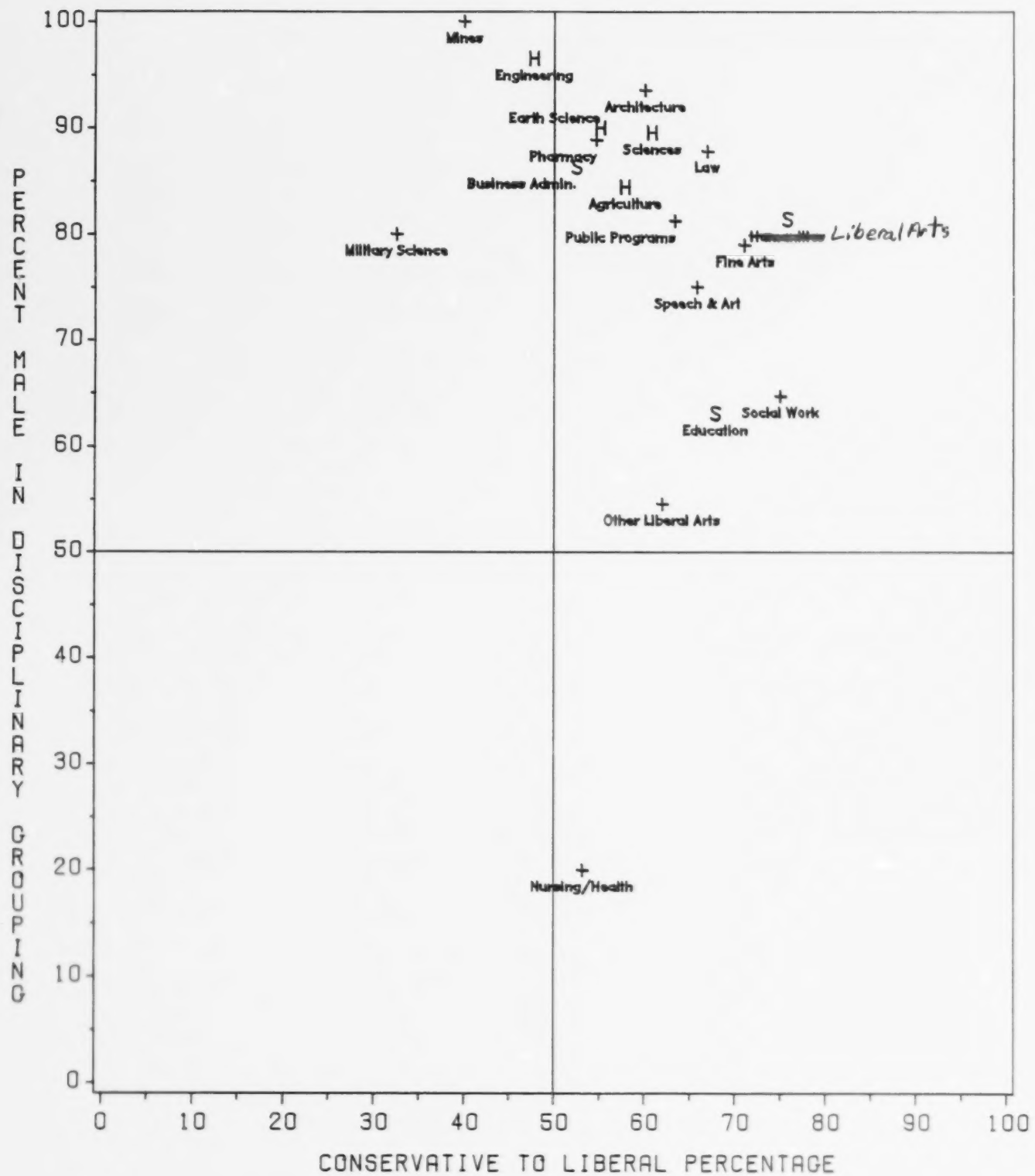
[3]Of course, each disciplinary grouping also has members from each of the three clusters included within it. This distribution is shown as Appendix C.

[4]Ladd and Lipset also found a strong relationship between age and political description. In this study age was only moderately significant, $\chi^2(12, N = 607) = 20.25$, $p=.063$), with those under 38 years only slightly less conservative than those 44 and over, with the 38 to 43 year-olds as the most liberal age group.

Figure 3.
DISCIPLINARY GROUPINGS PLOTTED BY GENDER AND POLITICAL DESCRIPTION




NOTE: 0=100% Conservative (Self Described), 100=100% Liberal.
S=Soft, H=Hard Biglan types. '+'=Not classified by Biglan.

draw from disciplines associated with departments classified as soft. Law, Military Science and Nursing were not so easily classified in terms of Biglan types largely because the departments have not been analyzed in Biglan-related research.

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Insert Figure 3 about here

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## Summary

The rationale for construction of a new typology of faculty members based on the priorities they express toward activities in which research universities engage has been laid out, and results of some preliminary research suggest this approach holds promise. Faculty in this study clustered along lines defined by their political persuasion and gender, variables that have not been reported as significant in most typologies of faculty. The primary strength of this approach involves the effort to relate faculty groupings to institutional priorities as well as the assumption of heterogeneity rather than homogeneity among faculty members belonging to a specific department. Although earlier research has shown significant differences across Biglan classifications on variables such as research output, stated goal preferences and salaries, the conceptual frameworks advanced have not adequately explained these differences (Cresswell and Bean, 1981). We believe that this may be because of the aggregated level of analysis and because demographic variables such as political attitudes and gender were not considered.

This research must be regarded as tentative, but the potential usefulness for classifying faculty into groups on the basis of their support for university activities is intuitively appealing. We intend to recode the existing database at the departmental level, and to examine the results in relation to such independent variables as the award of merit salary and department chair estimates of scholarly productivity and teaching effectiveness. The key question that remains unanswered by this study involves the relationship between behavior and priorities. In future application of this methodology we plan to explore this link.

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Appendix A

Text of the 66 Items of the Survey, "Priorities for Arizona Universities: A Statewide Opinion Survey"

| ITEM | TEXT |
|---|---|
| 1 | Sponsor films, speakers, exhibitions and musical and dramatic productions for students and the community. |
| 2 | Provide health care to the general public on a fee-for-service basis to train medical and other health professionals. |
| 3 | Provide incentives and training to assist students in developing and practicing leadership skills. |
| 4 | Conduct research under contracts funded by business, industry, foundations and government agencies to assist the training of graduate students and to keep faculty up-to-date. |
| 5 | Offer selected degree programs in fields such as medicine and law. |
| 6 | Operate non-profit public television stations as a community and educational service. |
| 7 | Offer selected undergraduate degree programs in business, engineering, education, architecture, social work, nursing, public administration, agriculture and forestry. |
| 8 | Conduct projects to apply the findings of research to everyday life. |
| 9 | Publish for sale scholarly books, pamphlets and reports to share the results of faculty and student research. |
| 10 | Earn a profit by leasing university facilities such as football stadiums, activity centers, meeting rooms and exhibition space to private corporations. |
| 11 | Provide counseling and related services to assist students in coping with problems such as depression, stress, and alcohol and drug abuse. |
| 12 | Conduct research to contribute to the future growth and welfare of the state and nation. |
| 13 | Accept international students who meet university admission standards. |
| 14 | Provide technical assistance to the general public in areas such as agriculture, forestry, resource and energy conservation and community development to assist citizens in applying research findings to everyday life. |
| 15 | Include information about the use of computers in all undergraduate degree programs. |
| 16 | Let non-profit organizations use university facilities such as football stadiums, activity centers and exhibition space if they pay all costs. |
| 17 | Provide selected programs and services at reduced tuition rates for senior citizens. |

18 Conduct research and provide technical assistance to meet the special needs of Arizona's ethnic and racial minorities.

19 Require all undergraduate degree programs to include liberal education courses such as humanities, fine arts, social and behavioral sciences, physical sciences and mathematics.

20 Provide information to keep the public informed of educational, social and other services offered by the universities or other agencies.

21 Sponsor competitive intercollegiate athletic programs for men and women.

22 Sponsor research in health science to improve standards of medical care and to train health professionals.

23 Actively recruit and offer financial aid to ethnic and racial minorities.

24 Provide university library services free to the general public.

25 Actively recruit and offer financial aid to students with academic and artistic talents.

26 Encourage advancement in the creative arts by sponsoring arts events, exhibitions and performances.

27 Award degrees only to students who pass a standard university test in writing skills.

28 Provide limited use of university resources such as secretarial help, computer time and copy services to faculty who serve as paid consultants to business and industry, government and community agencies.

29 Do research in areas such as energy, agriculture, electronics, government, economics, health and education to expand existing knowledge and help solve immediate problems.

30 Contract with private corporations to provide on-campus services currently run by universities such as bookstores, copying and food services.

31 Make special efforts to recruit and retain qualified women faculty.

32 Provide career and job placement services to current and former university students.

33 Permit state employees and their dependents to attend Arizona universities at reduced tuition rates.

34 Conduct research and provide technical assistance in areas such as juvenile delinquency, health care, child welfare and unemployment.

35 Sponsor recreational athletic programs for all students.

36 Operate a teaching hospital to advance knowledge and to help train medical and other health science students.

37 Require students who are not residents of Arizona to pay the full costs of their education.

38 Sponsor research to attract and keep well qualified faculty and students.

39 Provide information to keep the public informed of educational, social and other services offered by the universities or other agencies.

40 Provide conferences, short courses and workshops for doctors, lawyers, public administrators and similar groups to keep their skills up-to-date.

41 Sponsor student government, student publications and other activities related to student development outside of class.

42 Support the education program with research laboratories like those used in business and industry.

43 Offer selected courses by telecommunication, radio or correspondence.

44 Cooperate with state & local government, chambers of commerce and other non-profit groups in attracting business, industrial and residential development.

45 Provide tenure (reasonable assurance of continuing employment) to faculty who maintain professional standards approved by the Board of Regents.

46 Support research with libraries like those at other universities having similar programs.

47 Offer selected undergraduate degree programs in the humanities, fine arts, social and behavioral sciences, physical sciences and mathematics.

48 Offer non-credit courses and workshops for the general public in areas such as health, recreation and hobbies.

49 Make special efforts to recruit and retain qualified minority faculty.

50 Do research in the humanities, social and behavioral sciences, physical sciences and mathematics to expand existing knowledge and to help solve immediate problems.

51 Provide special assistance such as Braille texts, tutoring services, or sign language to physically handicapped students.

52 Provide students immediate medical care and continuing education on health-related problems.

53 Offer selected courses and degree programs at off-campus locations or branch campuses.

54 Include information about the achievements and needs of Arizona's ethnic and racial minorities as part of all undergraduate degree programs.

55 Offer selected courses to groups of employees at their work place.

56 Make special efforts to recruit and retain recognized scholars and researchers for university faculties.

57 Limit enrollment to students who graduated in the upper half of their high school class or who have above average scores on standardized aptitude tests.

58 Provide counseling and health services to help students avoid or cope with unwanted pregnancies.

59 Offer courses and workshops in areas such as study skills and academic survival skills.

60 Offer selected master's and doctoral degree programs in business, engineering, education, architecture, social work, public administration, agriculture and forestry.

61 Admit to regular university courses high school students who are recommended by their principals.

62 Develop programs in veterinary medicine, dentistry, optometry, and other professional areas not currently available at any Arizona university.

63 Offer selected master's and doctoral degree programs in the humanities, fine arts, social and behavioral sciences, physical sciences and mathematics.

64 Actively recruit and offer financial aid to students with athletic talents.

65 Provide academic advisement to assist students in meeting their educational goals.

66 Provide special tutoring and advisement to ethnic and racial minority students to help them get through their educational programs.

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Appendix B

Rotated Factor Structure and Factor Loadings for the 25 Items in the Final Factor Solution

| | FACTOR | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ITEM | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 49 | **92** | 14 | 9 | 5 | 8 | 3 | 4 | 14 |
| 23 | **76** | 24 | 8 | 8 | 13 | 13 | 3 | 7 |
| 31 | **75** | 19 | 12 | 9 | 8 | -2 | 4 | 10 |
| 66 | **68** | 17 | 9 | 1 | 1 | 6 | 5 | 18 |
| 26 | 12 | **64** | 16 | 15 | 17 | 4 | -3 | 11 |
| 63 | 9 | **63** | -3 | -12 | 9 | 10 | 16 | -1 |
| 1 | 12 | **55** | 10 | 13 | -2 | 8 | -2 | 10 |
| 13 | 14 | **54** | 12 | 1 | 3 | 17 | -1 | 1 |
| 47 | 12 | **53** | -4 | -8 | 6 | 1 | 24 | 5 |
| 19 | 6 | **46** | -9 | 4 | -1 | 4 | 5 | 5 |
| 43 | 5 | 10 | **66** | 10 | -2 | 6 | 13 | 1 |
| 55 | 10 | -2 | **63** | -1 | 6 | 6 | 2 | 18 |
| 53 | 8 | 3 | **61** | 7 | 1 | 4 | 4 | 5 |
| 21 | 5 | 8 | 3 | **87** | 2 | -3 | 5 | 4 |
| 64 | 7 | 2 | 11 | **67** | 3 | -6 | 11 | 4 |
| 38 | 6 | 8 | 5 | -2 | **69** | 6 | -2 | 4 |
| 56 | 9 | 16 | -10 | 3 | **63** | 13 | 3 | -8 |
| 42 | 2 | -8 | 13 | 7 | **42** | 12 | 25 | 13 |
| 2 | 3 | 18 | 10 | -4 | -1 | **63** | -2 | 8 |
| 36 | 5 | 21 | 2 | -2 | 17 | **63** | 17 | 4 |
| 62 | 3 | -2 | 3 | -3 | 16 | **40** | 11 | 6 |
| 60 | 6 | 15 | 5 | 6 | 19 | 14 | **65** | -1 |
| 7 | 3 | 10 | 12 | 11 | -5 | 8 | **64** | 3 |
| 58 | 32 | 14 | 17 | 5 | 7 | 10 | 2 | **79** |
| 52 | 20 | 22 | 19 | 8 | -2 | 20 | 5 | **45** |

Note. Loadings are multiplied by 100 and rounded to the nearest integer; loadings used for each factor are underlined.

Appendix C
Distribution of Cluster Membership by Disciplinary Grouping

| FREQUENCY / ROW PCT | CLUSTER 1 | 2 | 3 | TOTALS |
|---|---|---|---|---|
| Fine Arts | 11 | 10 | 18 | 39 |
| | 28.21 | 25.64 | 46.15 | |
| Education | 4 | 16 | 27 | 47 |
| | 8.51 | 34.04 | 57.45 | |
| Business Admin. | 27 | 5 | 16 | 48 |
| | 56.25 | 10.42 | 33.33 | |
| Engineering | 17 | 11 | 28 | 56 |
| | 30.36 | 19.64 | 50.00 | |
| Architecture | 9 | 7 | 15 | 31 |
| | 29.03 | 22.58 | 48.39 | |
| Nursing/Health | 8 | 8 | 23 | 39 |
| | 20.51 | 20.51 | 58.97 | |
| Social Work | 2 | 5 | 10 | 17 |
| | 11.76 | 29.41 | 58.82 | |
| Public Programs | 5 | 3 | 8 | 16 |
| | 31.25 | 18.75 | 50.00 | |
| Law | 5 | 16 | 18 | 39 |
| | 12.82 | 41.03 | 46.15 | |
| Earth Science | 4 | 8 | 8 | 20 |
| | 20.00 | 40.00 | 40.00 | |
| Mines | 11 | 2 | 7 | 20 |
| | 55.00 | 10.00 | 35.00 | |
| Agriculture | 11 | 10 | 11 | 32 |
| | 34.38 | 31.25 | 34.38 | |
| Pharmacy | 7 | 3 | 17 | 27 |
| | 25.93 | 11.11 | 62.96 | |
| Military Science | 3 | 1 | 6 | 10 |
| | 30.00 | 10.00 | 60.00 | |
| Other Liberal Arts | 2 | 7 | 14 | 23 |
| | 8.70 | 30.43 | 60.87 | |
| Sciences | 28 | 20 | 20 | 68 |
| | 41.18 | 29.41 | 29.41 | |
| Humanities | 13 | 33 | 29 | 75 |
| | 17.33 | 44.00 | 38.67 | |
| TOTALS | 167 | 165 | 275 | 607 |

$x^2$ (32, N = 607) = 84.637 $p<.0001$